[Death of 'The Squire.']

FROISSART AND HIS CHRONICLE.

No. VI.

ONE OF THE "DEEDS OF ARMS" OF CHIVALRY.

If ever an institution founded on so unnatural a basis as that of making war, or the art of destroying life, the pre-eminent object of living beings could have been permanent, it must have been that of chivalry; for certainly never was human institution better supported by all conceivable human devices. The deepest, most universal, and most unvarying qualities of our nature were, by a species of the subtlest skill, made subservient to a power which was a practical antithesis to them all. Thus, for the love of God, we were taught to destroy his noblest creatures and to deface his fair world; and in order to convince the 'ladies' of our devotion to their interests, it was necessary that we should be continually devising some new feat that was to injure or take off their lovers or husbands, their fathers or their sons. The practical success of such inconsistencies may no doubt be chiefly dated from the circumstance that the future knight's education began at so early a period, that his mind as well as his body was moulded into the desired shape, before anything like independent action took place. In our account of the 'Squire' from Chaucer,* Froissart's contemporary, we have had occasion to describe somewhat minutely the domestic education of the young aspirant, almost from the period of infancy to that of manhood. The very interesting incident we are now about to transcribe forms a suitable appendix to that description, showing the ruder and more dangerous species of exercises which, like the tournament, and other well-

* Vol. x., p. 101.

known chivalrous amusements of the period, kept up in the man the spirit of the boy, and, to use a modern phrase, gave us at least "an armed peace," whenever it was not exactly convenient to have war. Here is a "deed of arms," from Froissart; the period, we may premise, is that immediately following the peace concluded between De Montfort, duke of Brittany, and the king of France, in 1379, when the English, under the Duke of Buckingham, who had been acting in conjunction with the former, found it necessary to make the best of their way home:—

"The Constable of France was as then in the Castle of Josselyn, a seven miles from Vannes, and he had given safe conduct to divers knights, English and Navarrese, to go by land to the garrison of Cherbourg, the which knights had served the Earl of Buckingham in his said voyage; and among other there was Sir Evan of Fitzwarren, Sir William Clinton, and Sir John Burley. They departed from Vannes, and took their way by the Castle of Josselyn, and there lodged in the town without the castle, thinking no more but to dine there and so depart; and when they were alighted at their lodgings, certain companions of the castle, knights and squires, came to see them as men-of-war oftentimes will do, and especially Englishmen and Frenchmen. And among the Frenchmen there was a squire, a good man of arms, pertaining to the lord of Bourbon, Earl of March, and one that he loved entirely, called John Boucmell; he had been before that time in the garrison of Boulogne with Sir William Bourdes, with the Frenchmen against the garrison of Cherbourg, at which time there had been divers words spoken of deeds of arms to have been done between him and an English squire called Nicholas Clifford, the which Nicholas was as then there present. And when the Frenchmen were come to the Englishmen's lodging, and had communed together, and beheld each other, then John Boucmell began to speak, and said to Nicholas Clifford, 'Nicholas, divers times we have wished and devised to do deeds of arms together, and now we have found each other in place and time where we may accomplish it. Now we be here before the Constable of France, and other lords that be here present; therefore, I require you, let us have now three courses afoot with a spear, each of us against other.' Then Nicholas answered and said, 'John, ye know right well we be here going on our way by the safe conduct of my lord, your Constable; therefore that ye require cannot now be done, for I am not the chief of this safe conduct, for I am but under these other knights that be here; for though I would here abide, they would not do so.' Then the French squire answered, 'Nicholas, excuse you not by this means; let your company depart if they list, for I promise you by covenant, the arms once done between you and me, I shall bring you into the vale of Cherbourg without damage or peril; make ye no doubt thereof.' Then Nicholas answered and said, 'I think well that ye will bring me thither, and I believe it of a very truth, but ye see well how we go through the country without any harness; we have none with us, so that though I would arm, I have not wherewith.' Then answered John, 'Excuse you not by that; I shall show you what ye shall do: I have harness of divers sorts at my commandment; they shall be brought into the place whereas we shall do deeds of arms: then behold them well, and choose which ye will, and I shall choose the other.' When Nicholas Clifford saw himself so sore opposed, he was shamefaced, because of them that were there present and heard the matter; and he saw well how this John offered him so much reason, that he could not with his honesty refuse him. And moreover John said to him, 'Sir, take what part and what covenant ye will, and I shall not refuse it, rather than we should not do deeds of arms.' Then Nicholas said how he would take advice, and show him his mind ere he departed: 'And if be so that I may not do it now, and that the lords under whom I am will not agree thereto, I promise you, as soon as I come to Cherbourg and you to Boulogne, let me know of your coming thither, and I shall incontinent come to you, and deliver your challenge.' 'Nay, nay,' quoth John, 'seek no respite; I have offered and yet do offer you so many things so honourable, that in no wise ye can depart, saving your honour, without doing deeds of arms with me, sith I require you of it.' Then Nicholas with these words was sorer displeased than he was before, for he saw well (and true it was) that he laid sore to his charge. Therewith the Frenchmen went to the castle, and the Englishmen abode still at their lodging, and so dined; and when the Frenchmen were in their castle, there was no little speaking of the words that had been between John Boucmell and Nicholas Clifford, insomuch that the word thereof came to the Constable, and he studied a little thereat. Then the knights and squires of the country desired him that he would put to his pain that this deed of arms might be done; and the Constable said he was content therewith. And when they had dined, the English knights, such as were there and would depart, they went to the castle to see the Constable, and to speak with him, because he should send at the least seven knights to conduct them through Bretagne and Normandy to Cherbourg; and when they were come to the castle, the Constable received them meetly, and then said to them, 'Sirs, I arrest you all, so that ye shall not depart this day; and to-morrow after mass ye shall see deeds of arms done between our squire and yours, and then ye shall dine with me, and after dinner ye shall depart with such guides as shall bring you to Cherbourg;' so they agreed to him, and drank of his wine, and then returned to their lodging.

"Then these two squires, John and Nicholas, advised them well of the battle that they must furnish the next day; and so in the next morning they both heard one mass and were confessed, and so leapt on their horses, and all the lords of France on the one part and the Englishmen on the other part, and so came all together to a fair plain place without the castle of Josselyn, and there tarried. John Boucmell had made ready two harnesses fair and good according as he promised to the English squire; and then he said to him, 'Nicholas, choose which ye will have:' but he would in nowise choose, and gave the first choice to the French squire, and so he took the one and armed him therewith, and Nicholas did help to arm him, and so did he in likewise again; and when they were both two armed, they took good spears all of one length, and so each of them took his place, and came a fair pace afoot each against other; and when they should approach, they couched down their spears, and at the first stroke Nicholas Clifford strake John Boucmell on the breast, and the stroke did slide up to the gorget of mail, and the spear-head did enter into his throat, and did cut asunder the jugular vein, and the spear brake, and the truncheon stuck still in the squire's neck, who was with that stroke wounded to death: the English squire passed forth and went and sate down in his chair. When the lords saw that stroke, and saw how the truncheon stuck still, they came to him and took off his bascinet, and drew out the truncheon; and as soon as it was done he turned about without any word speaking, and so fell down dead suddenly; so that the English squire could not come to him time enough, *for he had certain words to have stanched him*, that would have holpen; but when he saw that he was dead, he was sore displeased be-

cause of that adventure, seeing how he should slay so valiant a man of arms. He that then had seen the Earl of March would have had pity to see what sorrow he made for his squire, for he loved him entirely. The Constable recomforted him, and said, 'In such deeds of arms let no man look for nothing else; though this evil fortune be fallen on our squire, the Englishman is not to blame, for he cannot amend it!' Then the Constable said to the Englishmen, 'Sirs, let us go and dine: it is time;' and so the Constable, against their good will, had them with him into the castle to dinner, for he would not break his promise for the death of his squire. The Earl of March wept piteously for his squire, and Nicholas Clifford went to his lodging and would not dine in the castle, what for sorrow, and for doubt of the French squire's friends. But the Constable sent so for him, that it behoved him to go to the castle; and when he was come, the Constable said, 'Certainly, Nicholas, I believe verily, and see well, how ye be sorry for the death of John Boucmell; but I excuse you, for ye cannot amend it: for, as God help me, if I had been in the same case as ye were in, ye have done nothing but I would have done the same, or more if I might; for better it is a man to grieve his enemy, than his enemy should grieve him: such be the adventures of arms:' so they sate down at the table and dined at their leisure." It is scarcely necessary to add that the promised safe-conduct was fully given.

Night in Newfoundland.—At dusk I walked on along the sandy beach, but was soon stopped by great boulders and masses of rock, requiring a good light and steady footing. I sat down on one of them, and gave myself up to the influence of the scene. The wind had sunk to a calm, and the sky was cloudless. Before me lay the lake, perfectly still, except here and there a ripple from a stray breath of air creeping across its surface; beyond it rose woody hills getting black with the shades of night; over these hills and woods there was no track except the deer-path; in all the country round there was no human being except myself and a few whose voices I could just hear from the little point where a small gleam of light and an occasional spark among the trees betrayed our bivouac. Except this, not a sound was to be heard,—literally not a sound,—not a ripple of the water, not a stir among the woods, not the hum of a single insect, nor the voice of a single bird. I believe this utter stillness is characteristic of all American woods, in Newfoundland it is most remarkable: if you hold your breath, your ear cannot detect the slightest interruption to the dead and dreary silence. It may, perhaps, savour of affectation, but there was something most oppressive to my feelings in this utter absence of sound, and I rose to go back, when my eye was struck by the most brilliant aurora I think I ever saw. A belt of yellow light rose in the north-east, and passing just above both the Bears, it disappeared in the north-western horizon. It was not a perfect arch, but a sinuous band, and it had a regular onward motion, like that of a waving riband, proceeding from the north-east to the north-west. The northern edge, or base, of this belt was a clear and well-defined continuous mass of light, while upwards it faded away into faint parallel rays. These rays had no divergence, and seemed to shoot upwards to a greater or less height from a certain long narrow base or floor, the plane of which was parallel to the surface of the earth. I could have likened it to a long and continued army of celestial spearmen, radiant from their own light, marching in dense array, with a regular sweeping course, and gradually unfolding themselves from a distant host massed together in the north-east, and passing along in regular procession towards the north-west. What increased the illusion was, a faint reflection of the central band a little distance on each side it, but more preceptibly on the outside, or towards the south, and this reflection followed the primary band in its long sinuosity, exhibiting the same occasional variations of brightness, and the same upward glancing of the light. I am sure the rays proceeded not from any point in the north, but shot upwards at right angles to the surface of the earth. I am not sure whether I render this description intelligible, but the effect to me was as if I was viewing a portion of a sinuous collar of light, at a great height above, but generally parallel to some parallel of latitude north of me, and thus encircling the pole of the earth, while from this collar perpendicular rays shot upwards. Thus both the arched appearance of the band and the convergence or divergence of the rays, if there were any, would be the effect of perspective merely. At first the greatest mass of light was in the north-east, but it got less as the stream proceeded from it, without perceptibly increasing in the north-west. The effect of this brilliant exhibition in the sky reflected in the still waters of the lake that stretched away beneath it, was majestic in the extreme, and I watched it till its brilliancy began to fade, and at length passed away.—*Jukes's Excursions in and about Newfoundland.*

Coral Reefs.—Few natural objects are so well calculated to excite wonder in the human mind as the coral constructions, in all their Protean forms, that surround the greater number of Polynesian islands, and which demonstrate so perfectly the power of nature to effect her vast designs through apparently feeble and inefficient agents. It requires, indeed, an intimate acquaintance with the habits of the lithophites, and ocular proofs of their labours, to credit what stupendous submarine reefs and islands, many miles in compass, are indebted for at least their entire visible structure to the secretory economy of these tiny architects. In such examples Raiatea is not deficient. On the contrary, she is indebted for a large share of her natural beauties, as well as commercial advantages, to the coral fabrics which surround her shores. These chiefly obtain in the form of reefs; of which the nature and use may be best understood by considering them under their natural divisions of a barrier and a shore reef. The former encircles the island as a breakwater or sea-wall, at the distance of one and a half or two miles from the land; presenting a precipitous face to the ocean, to receive the assault of its billows, but encroaching in a superficial and capricious manner upon the lagoon water it encloses. The shore reef is continuous with the land around the entire coast, and stretches into the sea to a variable, but usually to a very considerable distance. Its greater portion is covered with shallow water, which in many parts does not exceed, and is often less than, a foot in depth; its outer margin shelves irregularly, and terminated abruptly in a deep channel of blue water. The channel (which is also continued round the island) furnishes a natural division between the two principal reefs, as well as convenient passage for navigation. Coral islets, shoals, or whatever other form the madreporic rock may assume, can be distinctly traced to one or the other of these apparently distinct reefs, but never occur as the productions of both conjointly. The outer or barrier reef resembles a wall no less in its structure than in office: unlike the friable and arborescent material we commonly associate with the name of coral, the rock of which it is composed is hard, compact, and amorphous, bearing much resemblance to a very firm cement; and it is only on its shoals, extending towards the land, that we notice the elegant form of the tree-coral, contrasting so strongly with the rocky and unornamental structure on which it is planted, as to justify a doubt if both are constructed by the same animals. The summit of this reef is flat, several yards in breadth, but little raised above the level of the sea, and washed by a heavy surf, which breaks against its sea-aspect, courses over its level surface, and falls gently, and as it were by a line of cascades, into the placid basin on the opposite side. At ebb tide, when the surf is less in amount, this reef is partly dry and accessible; but when the tide is high, or the weather tempestuous, the sea, raised into lofty and magnificent arches, beats over the rocky barrier with terrific grandeur, and with a rolling or thundering sound, which may be heard, on a tranquil night, at the distance of several miles. A curious and mysterious feature in the construction of the barrier reef is presented in the occasional apertures that exist in its fabric, and which are of sufficient breadth and depth of water to permit ships to sail through them with facility. The shore reef is chiefly composed of amorphous rock, or block-coral, though tree-coral is also abundant upon it, as well as extensive beds of sand. In many parts, where the water is deep, it presents a submarine picture of extreme beauty; extensive coral-groves, planted in beds of smooth and white sand, and mingling hues of pink, blue, white, and yellow, appear through the transparent sea; numerous small fish, of brilliant colours, glide over the sands, thread the labyrinths of the coral branches, or, when alarmed, dart rapidly for shelter into the numerous recesses of the stony thickets: the whole affording a peculiarly pleasing and almost kaleidoscopic effect.—*Bennett's Whaling Voyage round the World.*

[Flower-Boat.]

CHINESE BOATS.

THE immense variety of boats which crowd the waters of China may be divided into two classes; those that have eyes, and those without them. To the former class belong the military and trading junks that navigate the 'great sea.' They are nearly in the shape of a new moon, and as clumsy a craft as could well be contrived, having sterns at least thirty feet above the water, and bows the third of that height. The Emperor not only affords no encouragement to improvement, but actually discourages it, in the exaction of foreign port duties from junks constructed on improved principles. These vessels have always a great eye painted on each side of the bows. This usage had its origin probably in some superstition. If a Chinaman is questioned as to its cause, his reply is, "Have eye, can see, can saavey; no have eye, no can see, no can saavey."

The craft used upon the inland waters of China vary from the rudely constructed junk, down to the small 'Sanpan.' There are boats appropriated to pleasure parties called 'Hwa-chow,' *i.e.* a flower-boat: they are frequently occupied by the wealthy classes in summer evenings, and are for the most part stationary, being moored together in rows, secured by strong hempen cables.

The material used in building boats in China is oak and teak: very little iron or copper is used, the bolts, knees, and staunchions being composed entirely of wood, as well as their ponderous anchors. The seams are all secured or payed (a nautical term) with chinam, which is a strong white substance like mortar, made from the Chinam-tree: it much resembles putty: becomes as firm as rock, and never starts, and the seams thus secured by it are perfectly safe and water-tight. The deck-planks of Chinese boats are never secured, although well contrived and dove-tailed into one another: they are made to take up at pleasure, as underneath are kept all the culinary utensils, spare cordage, and apparatus required.

The masts are made of bamboo, and the sails of rattan sewn together, and fastened to bamboo joints running parallel, so that the sails open in the manner of a fan, and can be reefed at pleasure by closing any of the joints, each angle having a rope or sheet attached which joins on to one which can be belayed at pleasure or held in the hand. The rudder is a large unwieldy affair, universally perforated with small holes, which may be set down as a wonder for the wise.

The river craft, and small boats particularly, are generally propelled by sculling, a method which is made absolutely necessary by the number of boats always in motion. This scull, which is usually of a large size, moves on a pivot fixed aft and lashed securely on one side, and the skill with which the Chinese perform this operation confirms the old proverb that "Practice makes perfect;" for the boat is made to dart forward at a rapid rate and in a line as direct as any well-managed sailing vessel could pursue. In the small sanpan and tanka boats, which are managed chiefly by females, in addition to the scull named, a girl sits forward and rows with a small scull fastened to a kind of thole-pin, or the sculler manages it with the foot.

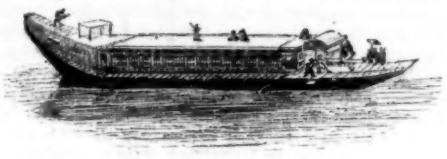
[Sanpan.]

On the canals and the rivers of the interior, oars are used in addition to the sculls. Mr. Davis, in 'The Chinese,' thus describes them:—"The oars which they occasionally use towards the head of their boats, besides the scull abaft, are rather short, with broad blades. These are suspended with a loop on a strong peg at the side of the boat, and there is an advantage in its not being always necessary to unship them, as, when useless, they are drawn by the water close to the vessel's side, without any retarding effect. There is besides no friction, nor any noise in a rullock, and no encumbrance of oars within the boat."

The interior accommodations and fittings up of Chinese boats show great ingenuity, and are adapted in every way to comfort. Large coverings or awnings stretch fore and aft, made of bamboos and rattan, and consist of several divisions, which can be removed either altogether or separately at pleasure: they are quite impervious to the rays of the sun. In the large chop and flower boats there is a complete upper deck, which is again covered in with an awning: it communicates with the interior of the boat by short steps.

The interiors of the flower and hoppo boats are very tasteful, indeed they may be compared to floating pavilions: they are beautifully painted, and carpeted or have a fine floor-cloth of the Chinese manufacture; latticed windows containing exotic shrubs and flowers make the interior quite light; the large lanterns are hung in front, and the rear is fitted up with a kind of altar where the Joss (the Chinese deity) is placed. The large boats are divided into two or three compartments, one being dedicated to culinary purposes, the others as sleeping and sitting rooms, and where every

comfort is enjoyed the same as in a house on shore. Mr. Davis thus describes one more particularly:—"The travelling barges used by mandarins and opulent persons afford a degree of comfort and accommodation quite unknown in boats of the same description elsewhere; but it must be repeated, that *speed* is a quality which they do not possess. The roof is not less than seven or eight feet in height, and the principal accommodations consist of an ante-room at the head for servants, a sitting-room about the centre of the boat, and a sleeping apartment and closet abaft. All the cooking goes on upon the high overhanging stern, where the crew also are accommodated. There are gangways of boards on each side of the vessel, which serve for poling it along the shallows, by means of very long and light bamboos, and which also allow of the servants and crew passing from head to stern



[Accommodation-Barge.]

without incommoding the inmates. The better boats are very well lit by glass windows at the sides, or by the thin interior laminæ of oyster-shells. Others have transparent paper or gauze, on which are painted flowers, birds, and other devices, while the partitions, or bulk-heads, of the apartments are varnished and gilded. The decks or floors of the cabins remove in square compartments, and admit of all the baggage being stowed away in the hold. Everything in their river-boats is kept remarkably clean, and this habit presents a strong contrast to their general neglect of cleanliness in their houses on shore, which have not the same ready access to water, and are besides often very ill drained. In short, their travelling barges are as much superior to the crank and ricketty budgerows of India, as our European ships are to the sea-junks of the Chinese, who seem to have reserved all their ingenuity for their river craft, and to have afforded as little encouragement as possible to maritime or foreign adventure."

The trading junks are very unwieldy, and having very little keel, besides being so bluff in the stem and stern, will only sail before the wind, therefore they perform their voyages alternately with the S.W. and N.E. monsoons. One of these boats is described as follows by Mr. Davis, in his 'Sketches of China:'—"The most remarkable objects that struck us here were some enormous large salt-junks, of a very singular shape, approaching to a crescent, with sterns at least thirty feet out of the water, and bows that were two-thirds of that height. They had 'bright sides,' that is, were varnished over the natural wood without painting, a very common style in China."

The boats called 'Tsau-chuen,' and used on the grand canal for the conveyance of grain, are very numerous: there are said to be no less than one thousand belonging to the government: they average about two thousand peculs, or above a hundred tons, but being flat-bottomed, and very high out of the water, they have the appearance of a much greater capacity.

The small 'Sanpan,' or family-boat, are by far the most numerous. Of this description there are estimated to be upwards of forty thousand on the Canton river near the city, containing a population of more than two hundred thousand souls. These boats are regularly licensed by government. The husband finds employment on shore, while the wife has charge of the floating domicile. These women seek a maintenance in carrying passengers to the neighbouring places. The cleanliness of their boats is remarkable. The late Dr. Morrison speaking of this tribe of people (Tan-hoo), who at Canton live entirely in boats, says:—"They were originally fishermen, who came from the south to Canton. They seem to have been named from the figure of their boats resembling an egg." These boats are from fifteen to twenty feet in length. Some of the old accounts of Canton say, that "on the river live many thousand souls, who never were permitted to come on shore," and these are descendants of Tartars. The people who live in boats originally came from the south, and being a foreign race, were not permitted to dwell on shore; but most of the distinctions between them and the rest of the people were removed by the Emperor Keen-lung, under the influence of general principles of equity.

The chop-boats are employed as lighters in transporting cargoes up and down the river, to and from foreign vessels at Whampoa.

[Chop-Boat.]

The mandarin boats, or revenue cutters, are very fast craft, and besides masts and sails, pull fifteen or sixteen oars of a side; they have from eighty to one hundred and twenty men, soldiers; their round shields are placed round the outside gunwale, and have a picturesque appearance: there is a poop aft, covered in with handsome rattan awning, which is appropriated to the mandarin and officers; a mounted gun is fitted forward in the stem of the boat, and forms the only piece of ordnance. The crew are armed with matchlocks and javelins, also bows and arrows. These mandarin boats greatly oppress the lower orders in the Sanpans, taking away from them money or any present they may have received from a foreign ship: it is a process called 'squeezing,' and should the party make any resistance, they get very roughly handled.

ON THE NATURE AND MANUFACTURE OF VELVET.

From the time when *velvet* was first employed as a material for dress, its beautiful texture has always been greatly admired; indeed there is perhaps no other manufactured fabric which can equal it for softness and delicacy. As a variety of the silk manufacture, it may be deemed comparatively modern, since many centuries appear to have elapsed after the introduction of plain woven silks, before velvet was heard

of. Mr. Porter, in his 'Treatise on the Silk Manufacture,' states that the manufacture of velvet was for a long time confined to Italy, where, particularly in Florence, Milan, Venice, Lucca, and Genoa, it was carried on to a great extent, and with a considerable degree of perfection. When, however, the French manufacturers took up this branch of silk-weaving, they speedily excelled their instructors; and it was from the refugees of that nation, when forced to leave their country by the revocation of the Edict of Nantes, in the year 1685, that the art of weaving became known and domesticated in Spitalfields, where it has since continued with varying degrees of success. The same cause having driven another portion of the French Protestants to Holland, the knowledge and prosecution of the manufacture became located there also. At Haarlem, especially, a very considerable establishment was formed with this object in view; but its productions were never brought successfully to rival the beauty of French velvets, which continued for a long time to command a greater price in foreign markets than those of any other country.

Mr. Planché states that velvet was mentioned, in various records of the thirteenth century, under the Latin name of *villosa*, and the French name of *velouis*. The latter name, derived from *velu*, 'hairy,' or 'covered with hair,' indicates in some degree the nature of the texture; since the peculiar softness of velvet is owing to a loose 'pile,' or surface of threads, unlike anything presented by the plain varieties of silk goods. It need perhaps hardly be remarked that plain silks, as well as most woven fabrics, consist of threads crossing each other at right angles; the 'long-threads' being technically called the *warp*, and the 'cross-threads' the *shoot* or *weft*. But it is evident at a glance that velvet possesses an additional feature in its construction. The back of the velvet exhibits the warp and shoot with more or less distinctness; but the face has a short shag, or 'pile,' occasioned by the insertion of short pieces of silk thread doubled under the shoot; these stand upright on the upper surface of the velvet, in such numbers and so crowded together as entirely to conceal the interlacings of the warp and shoot. It is to this 'pile' that the velvet owes its characteristic appearance, as well as that remarkable softness to the touch which distinguishes it from all other woven fabrics, and which, while it would be difficult to explain them in any intelligible terms, have themselves served for describing other bodies which present appearances or qualities somewhat similar. The beauty of the surface results in a great degree from the uniform evenness of the 'pile;' while this evenness depends upon the perfect equality in the length of the threads composing the pile; any irregularities detract very considerably from the market value of the goods, and hence the weaver has a motive for extreme care in the prosecution of this branch of manufacture.

The insertion of the short threads which form the pile must necessarily be effected in the weaving itself; and this is done in a manner which we proceed to describe. Instead of having only one row of warp-threads, which will be crossed alternately over and under by the shoot, there are *two* sets, one of which is to form the regular warp, while the other is to constitute the pile; and these two sets are so arranged in the loom as to be kept separate. The quantity of the pile-thread necessary is very much more than that of the warp-thread; and therefore must be supplied to the loom by a different agency.

If the pile-threads were worked in among the shoot in the same way as the warp-threads, the fabric would be simply a kind of double silk, but without any kind of pile; the pile-threads are therefore formed into a series of loops, standing up from the surface of the silk; and by subsequently cutting these loops with a sharp instrument, the pile is produced. The loops are formed in a very singular way. After the weaver has thrown the shuttle three times across, making the shoot interlace three times among the threads of the warp, he inserts a thin straight brass wire at right angles to the length of the piece, or parallel with the shoot. This wire is so placed as to occupy a position through the whole breadth of the fabric, above the warp-threads and below the pile-threads. The treadle is then put to work, the alternate threads of the warp raised, and the shuttle again thrown; by which a shoot-thread is thrown *over* the pile-threads, and also over one-half of the warp-threads; the wire becomes thus, as it were, woven into the substance of the fabric. Two more traverses of the shoot are then made, passing alternately under and over the warp-threads in the usual way, but not interfering with the pile-threads. Another wire is then laid in, below all the pile-threads and above all the warp-threads, and this is secured by subsequent shoot-threads, as in the first case.

We have thus a very small portion of woven silk, with two brass wires inserted among it; and by a most delicate and difficult operation, these wires are removed by the same operation which produces the raised pile. Each wire is nearly a semicylinder in form, and has along its upper surface a carefully constructed groove, and along this groove the weaver passes the sharp edge of a cutting instrument called a *trevat*, severing the pile-threads in his progress. It necessarily follows from this operation that two ends of each thread are thus loosened, and these ends, being afterwards brushed up and dressed, constitute a portion of the pile, sufficiently long to hide completely the woven fabric beneath. Two wires are employed, because if one only were used, the pile-threads would become disarranged when it was removed. When the liberated wire has been again inserted, and three shoots thrown to secure it, the second line of loops is cut and the second wire removed; and so on during the weaving of the whole length. The slowness and delicacy of this branch of manufacture may be judged from the fact that forty or fifty insertions of the grooved wire are made in the space of one inch, the loops of the pile being cut an equal number of times. In addition to the other complications, the weaver has to use two shoot-threads, and consequently two shuttles; for the shoot thrown immediately after the insertion of the wire is stouter than the two following. Mr. Porter thus speaks of the unintermitting carefulness required in the succession of operations on the part of the weaver:—"The use of the trevat in cutting the pile calls for a certain amount of skilfulness or sleight of hand, only to be fully acquired through care and after long practice, while the minutest deviation from the proper line in performing this part of the process would infallibly injure, if even it did not destroy the goods; and the movements to be made throughout the entire operation are so numerous and require such constant changing of the hand from one action to another, that the weaver is greatly and unavoidably retarded in his progress. It is considered to amount to a very good day's work when as much as one yard of plain velvet has been woven. For this the workman is usually paid five times the price charged for weaving gros-de-Naples."

It is at the option of the manufacturer to give to the velvet a greater or less degree of richness, by the closeness or number of the pile-threads; since the woven fabric beneath will be more or less completely hidden according to the thickness or fulness of the pile. Sometimes *striped* velvets are made; and these

owe their peculiar appearance to some of the pile-threads being left uncut. The number of threads thus left depends on the width of the stripe; and it follows, from the nature of the arrangement, that the stripe runs cross-way of the velvet, or in the direction of the shoot.

Instead of silk, cotton has been employed within the last few years as a material for velvet, or rather for a fabric bearing some faint resemblance to velvet; but the difference between them is so great, that 'cotton velvet' can only be used at times and in places where temporary appearance is required rather than durability. It is, in fact, one of those numerous attempts at cheapness which have resulted from the cotton manufacture. There are, however, other varieties of cotton goods, resembling velvet in the circumstance of having a pile or nap, but possessing a strength and durability which render them very valuable as materials for coarse clothing; we mean the different varieties of *fustian*, of which a word or two may here be said.

There are a great many cotton fabrics, differing slightly one from another, but forming collectively a class very different from all such goods as calico; this class has been sometimes called *fustian*, for want of a more comprehensive name. In most of these kinds, a 'flushing,' or portion of the shoot-thread, is left, so that when cut they may produce a pile or nap. Some flushed patterns are produced by extra warp or weft, either coarser than the ground or of a different colour; others proceed from certain portions of the shoot which are floated above or below the warp. Smooth fustians, when cropped or shorn before dyeing, are called *moleskin*, and form a material which has been used within the last few years for trowsers. When shorn after being dyed, they obtain the name of *beaverteen*. The cotton goods called *cantoon* is a fustian with a fine cord visible upon the one side, and a satiny surface of yarns, running at right angles to the cords, upon the other side. When the fabric has a surface of large parallel cords, it obtains the name of *corduroy*. In all of these varieties a loose portion, or 'flushing,' is worked into the woven material, and is either cut to form a pile, or left uncut, according to the pattern. The cutting of the pile is not effected in the same slow way as for silk velvets, but by the following method:—The woven piece, after being taken from the loom, is spread out flat upon a table about six feet long, with a roller at one end, on which the cloth is wound till cut, and another roller at the other end, to receive the cut cloth. The workman then takes a knife of a very peculiar shape, and insinuating the projecting point under the loose pile-threads, runs the knife quickly along through the whole length of six feet, severing the pile-threads in its progress. This process is repeated throughout the width of the cloth. The difficulty of cutting the threads with accuracy and quickness has led to the invention of a machine in which several knives are made to act simultaneously. The cloths are then subjected to the action of a teazling or roughing machine, to render the cut pile shaggy. To describe the causes of the difference between the various kinds of cotton goods enumerated above would be to give an analysis of some of the most difficult parts of weaving; but we allude to them for the sake of analogy; since the production of the pile or shag on such of them as have that kind of surface, is much the same in principle as that of the pile on velvet, and is due to the cutting of loose threads only partially interlaced among the others, and the brushing and cropping of these cut threads to a regular surface.

ON RIVERS, GEOGRAPHICALLY CONSIDERED.

[Continued from page 352.]

The number of rivers which do not reach the ocean is not great, if we except those which fall into the Caspian Sea and into the Lake of Aral. The other rivers without an outlet always terminate their course in a lake. It was formerly supposed that the water of some of them was absorbed by a dry soil, and that they were lost in the sand; and this opinion still prevails as to some rivers which descend from Mount Atlas southward to the Sahara. But as none of these rivers have been visited by Europeans, the point remains doubtful. Among other rivers which have no communication with the sea, some few traverse elevated table-lands, consisting of plains surrounded by continuous mountain-ranges, through which the waters cannot find an outlet, and consequently collect in the lower part of the plains, and form lakes large enough to part with all their surplus water by evaporation. Such rivers occur in the valley of Tenochtitlan in Mexico. The most remarkable is the Desaguadero, in the valley of Titicaca in Bolivia, which runs about three hundred miles, and is lost in a lake or in swamps. The Hyarkan or Yerkan, in Chinese Turkistan, is still larger, but its character is imperfectly known. Another kind of such lakes occurs in the plains of Mexico and of South America, and almost exclusively in those parts which have no rain or very little. On the table-land of Mexico the greater number of rivers between 24° and 30° N. lat. terminate in lakes; and in the states which compose the Argentine Republic rivers of this kind are numerous between 28° and 34° S. lat., west of 64° W. long. As very little rain falls in some of these countries, and in others none at all, the rivers are supplied with water by the rains which fall at certain seasons on the mountains in which they originate, and by the springs which exist there. But as the supply of water is very moderate, it does not give force sufficient to the currents to carry them through those extensive tracts which separate them from the sea. It is remarkable that some of these rivers and all the lakes in which they terminate are salt in South America; and it is probable that this is also the case with most of those on the Mexican isthmus.

Most rivers overflow the low countries which are adjacent to their banks, either at regular seasons of the year or occasionally. This takes place when the supply of water is greater than the bed of the river can contain. In this respect rivers may be divided into three classes: the first comprehends the rivers whose inundations are produced by the melting of snow and ice; the second comprehends those which are annually swollen by regular rains; and the third those which only occasionally cause inundations.

All large rivers that drain countries of which the mean winter temperature is below 30°, are annually subject to great risings when the snow and ice melt. In such countries snow falls for several months, and as only a small part of it is dissolved, it accumulates to a great amount. As soon as the frost ceases, the snow begins to melt, and runs off by the smaller rivers, which suddenly swell and carry an unusual supply of water to the principal river, whose volume, being thus increased to three or four times its ordinary magnitude, overflows the adjacent low country. These inundations, though they generally improve the soil, are very injurious to agriculture, by destroying the growing corn, and covering extensive tracts with sand, gravel, and other coarse earthy matter. Embankments are usually made to prevent these inundations, but after a very long winter, when the river is more than

usually swollen, these embankments are often destroyed, and the injurious effects of these inundations are increased by the mass of earthy materials of which the embankments consist, and which are dispersed over the adjacent lands. In some rivers these inundations last only from two to four weeks; in others two or three months; and in some even five or six months. Where the inundations are long, they are less violent, and cause less damage than where they are short; in the latter case the whole mass of water suddenly deluges the country, while in the former the water rises slowly. This difference in the inundations of rivers is mainly to be attributed to the direction in which they flow. Let us take a river like the Mississippi, which flows from north to south through 17° or 18° of latitude. In winter the basin is covered with snow, and if the whole were melted in a few days, it would produce such a volume of water as would probably cover nearly half the basin. But the melting of the snow is gradual. Whilst the temperature in the northern districts is below the freezing-point, the spring has already made considerable progress in the southern districts, the snow which has there fallen has been dissolved, and the water thus produced has had the requisite time to run off and reach the sea. Thus with the progress of the sun towards the northern tropic, the line of the melting snow proceeds northward, and thus the supply of water runs off gradually, until the snow of the most northern region is dissolved. More than two months elapse between the melting of the snow in the northern region and the commencement of the melting in the lower part of the river. The inundations of the Mississippi therefore are not extensive, if the great length of that river and of its affluents are considered, but they last from three to four months. A considerable part of the delta of that river is indeed under water for six months, but this must be ascribed to the tract of elevated ground which extends not far from the sea, between the Atchafalaya and the La Fourche, and prevents the enormous mass of water which collects in the lowlands near the first-mentioned branch from running off sooner. When a river situated in the northern hemisphere flows from south to north, the melting of the snow of course commences near the upper branches of the river, and proceeds northward. In this case the volume of water which collects at a certain period in the lower course, where the lowlands are generally most extensive, is much greater, and the inundations are much more extensive and attended with more mischief. But still they cannot be compared with the inundations of those rivers which run from east to west or from west to east. In countries which are drained by such rivers, the whole mass of snow is dissolved in a few days, especially when a thaw is accompanied by rain, and all the waters thus produced pass through the principal channel in the course of a week or two. In such rivers the volume of water during the inundations is three or four times larger than it is in the middle of the summer or the beginning of autumn, and the inundations spread to a great distance, and frequently cause great loss of property, and sometimes also of life, especially when the winter has been unusually long and the falls of snow very heavy. But the river St. Lawrence forms an exception here also. As its general course is from west to east, one would suppose that a large extent of country within its basin would be annually subject to inundation, but this does not appear to be the case in any part of its course. If any portion of it is swollen by the melting of the snow within the basin, the river soon enters one of the lakes through which its course lies, and thus the addition of a comparatively small volume is not sufficient to raise the surface of the lake to any large amount. Thus the same cause which prevents its filling up the wide æstuary prevents the river from overflowing the adjacent country.

Rivers whose inundations are produced by regular rains have the greater part of their course either within the tropics or at least between 30° N. lat. and 30° S. lat. It is a known fact, that in those regions heavy rain falls daily from three to six months in the year. These heavy rains commence when the sun in its progress from one tropic to the other approaches the zenith of a country, and they continue till it has passed a certain distance from it. In the beginning of the wet season, as this part of the year is called in those countries, the rains are sometimes so heavy that in the course of a day the level country is covered with water a foot deep. The rivers of course soon begin to increase in their volume of water, and after some time they rise to the level of the banks, and begin to run over. These inundations generally last from two to four months. They are more regular than those which are produced by the melting of the snow, and in general do not exceed a certain height. The rural economy of those countries in which they take place is founded on the knowledge of this periodical event, and on the certainty that the inundations will fertilise the fields by depositing on them a fine mud, which enriches the soil more than the best manure. Whenever the inundations do not rise to the usual height, which is sometimes the case, a great part of the country which is not covered with water yields little or nothing, and the consequence is dearth and famine. When, on the other hand, the inundations rise higher than usual, they are also injurious to rural economy, by reaching those tracts which are set apart for the cultivation of plants which cannot bear so much moisture as the districts which are regularly flooded. Thus, in 1831, the river Menam in Siam rose to an extraordinary height; the inundations reached the large orchards which for many miles in extent cover the more elevated tracts along the banks, and afford subsistence to a numerous population. Several kinds of fruit-trees were almost destroyed, and for some years the mangustans and durians were scarce.

All the rivers between the tropics which are swollen by periodical rains lie only in one hemisphere, the northern or the southern. In the countries through which they flow the waters are low and the ground dry during part of the year, so as to admit of easy cultivation, and at another season the fields are fertilised by the inundations. The Amazonas alone is an exception. Though the course of this river is in the southern hemisphere, its affluents extend far to the north and south, into both hemispheres, and probably three-fourths of the tropical rains which descend upon South America find their way to that large river. To this circumstance are owing its immense volume of water and its great depth. The Amazonas, properly speaking, is never at its lowest level, in the sense in which that term is applied to other rivers. When the northern rivers cease to bring down the supply which is owing to the periodical rains, the southern begin to bring their contributions. This fact seems sufficiently to explain the immense tracts of alluvial soil which extend along the river to a great distance, but the same circumstance also keeps the soil in a state of continual moisture, and makes it a perpetual swamp. Accordingly we find that the banks of that river, which admits of a more extensive navigation than any other river in the world, remain nearly destitute of agricultural settlements, and are still in possession of savage tribes.

[To be continued.]